

Remarks/Argument

Abstract

The examiner has objected to the length of the abstract. The applicant has amended the abstract such that it is less than 150 words. The applicant therefore respectfully requests that the examiner withdraw this rejection.

35 USC 103

The examiner has rejected claims 1, 9-21, 29-41, and 49 under 35 USC 103(a) as being unpatentable over Deeba et al, US 6,093,378. The examiner concedes that Deeba '378 "fails to disclose converting a portion of the gas stream to a reducing gas." Instead, the examiner argues that "it would have been obvious to one of ordinary skill in the art at the time the invention was made to convert a portion of the gas stream to a reducing gas because Deeba discloses the barium zeolite composition traps hydrocarbons and releases as a reducing agent, which would motivate an ordinary artisan to trap the hydrocarbons as disclose and convert them to reducing agent to be used in NO_x conversion, as disclosed." The examiner references column 8, lines 13-19 of the Deeba '378 disclosure as support for this contention.

At column 8, lines 13-19 of the Deeba '378 disclosure we find the following disclosure:

It has been found that by the combination of a refractory oxide supported precious metal catalyst, a zeolite containing precious metal and most preferably a zeolite in the absence of precious metal, oxidation of oxidizable components of the exhaust gas including carbon monoxide, gaseous hydrocarbons and VOF's can be accomplished in addition to enhanced reduction of nitrogen oxides over a broad exhaust temperature range. The presence of the zeolite traps the hydrocarbons at low temperatures and releases them at higher temperatures to be used as a reducing agent for nitrogen oxide reduction."

Thus, while Deeba recognizes the advantage of trapping hydrocarbons at a low temperature and releasing them have a high temperature, so that they can be used as a reducing agent for nitrogen oxide reduction, nowhere does Deeba teach the *conversion* of

effluent gasses to those reducing gases, as required by claim 1, and all dependent claims by virtue dependency.

Regarding claims 9-11, 14-15, 29-31, 34-35, and 49, the examiner argues that Deeba '378 discloses the first component may be a barium Y zeolite with an exchangeable Na cation. The examiner cites column 11, lines 27-40 of the Deeba '378 reference as support for this contention. At column 11, lines 21-44 of the Deeba '378 reference we find the following disclosure:

The exchangeable cations M.sup.1 present in the zeolites mentioned may be, for example, those of K, Mg, Ca, Sr, Ba and also transition metal cations, such as, for example, Mn, Fe, Co, Ni, Cu, Rh and Pt. Cations of the rare earth group and protons are also suitable.

In specific embodiments, the first zeolite is characterized by general formula (I) wherein M.sup.2 comprises a trivalent metal and M.sup.1 comprises substantially no precious metal. Preferably, the first zeolite is characterized by general formula (I) wherein M.sup.2 comprises at least one metal selected from the group consisting of Al, B, Ga, In, Fe, Cr, V, S and Sb and M.sup.1 is selected from the group consisting of hydrogen and/or at least one metal selected from the group consisting of K, Mg, Ca, Sr, Ba, Mn, Fe, Co, Ni and Cu. Most preferred M.sup.2 is Al and most preferred M.sup.1 is selected from H, Mg, Ca, Sr, Ba and Mn, with H being most preferred. More preferred, first zeolites are selected from the group consisting of faujasites, pentasils, mordenites, Y and beta, with pentasils and beta most preferred. The most preferred, first zeolite comprises beta zeolite. Preferably, the first zeolite comprises a three-dimensional zeolite characterized by pore openings whose smallest cross-sectional dimension is at least about five Angstroms and having a silicon to aluminum atomic ratio of greater than 5.

Within this disclosure we arrive at the heart of the matter. Deeba is undoubtedly seeking the same result as the present invention, and has done so using a similar, two zeolite system. However, Deeba's system differs from the present invention, because the cation Deeba puts in Deeba's first zeolite is described as "at least one metal selected from the group consisting of Al, B, Ga, In, Fe, Cr, V, S and Sb and M.sup.1 is selected from the group consisting of hydrogen and/or at least one metal selected from the group consisting of K, Mg, Ca, Sr, Ba, Mn, Fe, Co, Ni and Cu. Most preferred M.sup.2 is Al and most preferred M.sup.1 is selected from H, Mg, Ca, Sr, Ba and Mn, with H being most preferred."

In contrast, the present invention claims discloses an alkaline cation and an alkaline earth cation as the preferred cations for promoting the desired reactions. (See page 8, line 30). Accordingly the Deeba disclosure and the present invention disclose overlapping ranges for the materials that may be used to effectuate the respective inventions. As such, some of the materials disclosed by Deeba would "convert() a portion of the gas stream to a reducing gas" as required by the present claims, and some would not. Accordingly, the examiner's prima facie case of obviousness rises or falls on the determination of whether it would have been obvious to one of ordinary skill in the art to select the specific cations disclosed in the Deeba reference, and others NOT disclosed in the Deeba reference, to make a zeolite that would "convert() a portion of the gas stream to a reducing gas."

This issue is well-traveled ground, and represents a question the Courts have repeatedly considered. Within the MPEP, the decisions of these Courts instruct the examiner that "a particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977)" With respect to the instant claims, how does the Examiner establish that Deeba recognized which, if any, of the zeolites disclosed by Deeba would "convert() a portion of the gas stream to a reducing gas?" Deeba cannot, and the examiner has admitted as much, when the examiner stated Deeba "fails to disclose converting a portion of the gas stream to a reducing gas."

Having made this concession, the examiner is then obligated to set forth affirmatively a teaching that shows how a skilled artisan would be led to make the appropriate selection. The examiner recites that "it would have been obvious to one of ordinary skill in the art at the time the invention was made to convert a portion of the gas stream to a reducing gas because Deeba discloses the barium zeolite composition traps hydrocarbons and releases as a reducing agent, which would motivate an ordinary artisan to trap the hydrocarbons as disclose and convert them to reducing agent to be used in NO_x conversion, as disclosed." At best, all this demonstrates is that a skilled artisan,

having reviewed Deeba, may have been motivated to determine which of the possible zeolites disclosed by Deeba might perform this function. Equally plausible is the argument that this disclosure demonstrates that Deeba failed entirely to recognize even the possibility of doing so, because having recognized the value of these gasses in the second stage of the reaction, Deeba makes no mention of creating the gasses through catalyzed reactions. In either event, the Deeba disclosure does not set forth any way for the skilled artisan to make the appropriate selection among the various zeolite possibilities, some of which will work, and others of which will not, which is precisely what the present invention has accomplished.

Again, quoting from the MPEP "[w]hen an examiner relies on a scientific theory, evidentiary support for the existence and meaning of that theory *must be provided*. In re Grose, 592 F.2d 1161, 201 USPQ 57 (CCPA 1979) see In re Ahlert, 424 F.2d 1088, 1091, 165 USPQ 418, 420-421 (CCPA 1970) ("[A]ssertions of technical facts in areas of esoteric technology *must always be supported by citation of some reference work*" and "allegations concerning specific 'knowledge' of the prior art, which might be peculiar to a particular art *should also be supported*." Furthermore the applicant must be given the opportunity to challenge the correctness of such assertions and allegations. "The facts so noticed serve to 'fill the gaps' which might exist in the evidentiary showing" and *should not comprise the principle evidence upon which a rejection is based.*") (italics added).

Deeba simply cannot provide the requisite teaching, because while Deeba recognizes the possibility of trapping the reactive gasses, Deeba fails entirely to recognize the desirability of creating those same gasses.

Finally, perhaps the best evidence that the present invention is not obvious is the simple observation that the present invention has demonstrated a significant advance in the common goal of NO_x reduction over the references cited by the examiner. There is no question that this is a crowded art area. The publications cited in the background section of the Deeba reference, combined with the publications cited in the background section of the present application, demonstrate conclusively that numerous researchers on a global basis have been working for years to solve the problem of NO_x reduction. With so much energy devoted to this common goal, it goes without saying that any

improvement in the total amount of NO_x reduction satisfies a "long felt need." Thus, the examiner's attention is drawn to the result shown by the present invention in the figures, and the results obtained by the Deeba disclosure as shown in the Deeba figures. Specifically, figures 5 and 9 of the present invention demonstrate a significant improvement in NO_x reduction when compared to the NO_x reduction shown in Figures 1-3 and 5 of the Deeba reference. As set forth in the MPEP, the binding authority of the Federal Circuit is dispositive on this issue: "Thus when differences that may appear technologically minor nonetheless have a practical impact, particularly in a crowded field, the decision-maker must consider the obviousness of the new structure in this light. Such objective indicia as commercial success, or filling an existing need, illuminate the technological and commercial environment of the inventor, and aid in understanding the state of the art at the time the invention was made." *Continental Can co. USA v. Monsanto Co.*, 948 F.2d 1264, 20 USPQ 2d 1746, 1752 (Fed. Cir. 1991).

Accordingly, none of the references shown by the examiner teach the claimed limitation of "converting a portion of the gas stream to a reducing gas." Further, none of the references suggest any means for selecting a proper zeolite to accomplish the claimed limitation of "converting a portion of the gas stream to a reducing gas." Finally, the present invention's limitation of "converting a portion of the gas stream to a reducing gas" demonstrably accomplishes the goal long-sought by those having ordinary skill in the art; the enhanced reduction of NO_x in an exhaust stream. As such, whether considering only the intrinsic evidence supplied in the cited references, or the extrinsic evidence of the present invention's superior performance when compared to the voluminous record of prior art references, the same conclusion must be drawn: the present invention is not obvious in light of the prior art cited by the examiner.

Closure

Applicant has thus made an earnest attempt to place the above referenced application in condition for allowance and action toward that end is respectfully requested. If the not allowed, the applicant respectfully requests that the amendments to the claims and specification set forth herein nevertheless be entered into the record. Should the